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PTO/SB/08A (10-96)
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 4

Complete if Known

Application Number 09/481,803
Filing Date 08/31/1998
First Named Inventor TAVKHELIDZE, Avto
Group Art Unit 2834
Examiner Name TAMAI, K
Attorney Docket Number

#17/IDS
Hawkins
1/15/02

U.S. PATENT DOCUMENTS

Examiner Initials ⁷	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
Karl Imayoshi D. Ito		6,089,311		Edelson. J.S.	07-18-00	
		2,510,397		Hansell. C.W.	06-06-50	
		2,915,652		Hatsopoulos. G.N.	12-01-59	
		3,021,472		Hernqvist. K.G.	02-13-62	
		3,118,107		Gabor. D.	01-14-64	
		3,169,200		Huffman. F.N.	02-09-65	
		3,173,032		Maynard. J.T.	03-09-65	
		3,238,395		Sense. K.A.	03-01-66	
		3,239,745		Hernqvist. K.G.	03-08-66	
		3,267,307		Fox. R.	08-16-66	
		3,267,308		Hernqvist. K.G.	08-16-66	
		3,281,372		Haas. G.A.	10-25-66	
		3,300,660		Bensimon. J.	01-24-67	
		3,328,611		Davis. E.D.	06-27-67	
		3,376,437		Meyerand, Jr. R.G.	04-02-68	
		3,393,330		Vary. A.	07-16-68	
		3,470,393		Moncorge. G.	09-30-69	
		3,515,908		Caldwell. F.	06-02-70	
		3,519,854		Davis. E.D.	07-07-70	
		3,578,992		Shimada. K.	05-18-71	

FOREIGN PATENT DOCUMENTS

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		Office ³	Number ⁴	Kind Code ⁵ (if known)				
Karl Imayoshi D. Ito			JP404080964A		Ando, Y.	03-13-92		

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Karl Imayoshi

Date
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		Number	Kind Code ² (if known)			
[Handwritten Signature]		4,004,210		Yater. J.C.	01-18-77	
		4,039,352		Marinescu. M.	08-02-77	
		4,410,951		Nakamura. T.	10-18-83	
		4,423,347		Kleinschmidt. P.	12-27-83	
		4,958,201		Mimura. T.	09-18-90	
		5,028,835		Fitzpatrick. G.O.	07-02-91	
		5,049,775		Smits. J.	09-17-91	
		5,119,151		Onda. K.	01-02-92	
		5,229,320		Ugajin. R.	07-20-93	
		5,233,205		Usagawa. T.	08-03-93	
		5,247,223		Mori. Y.	09-21-93	
		5,332,952		Ugajin. R.	07-26-94	
		5,351,412		Furuhata. T.	10-04-94	
		5,356,484		Yater. J.C.	10-18-94	
		5,371,388		Oda. H.	12-06-94	
		5,521,735		Shimizu. A.	05-28-96	
		5,675,972		Edelson. J.S.	10-14-97	
		5,699,668		Cox. I.W.	12-23-97	
		5,722,242		Edelson. J.S.	03-03-98	
		5,810,980		Edelson. J.S.	09-22-98	

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OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), data, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
all	1	FITZPATRICK. G.O. et al. "Close-Spaced Thermionic Converters with Active Spacing Control and Heat Pipe Isothermal Emitters." IEEE. Vol 2: 920-927 (1996)	
all	2	FITZPATRICK. G.O. et al. "Demonstration of Close-Spaced Thermionic Converters." Abs. Papers. Am. Chem. Soc. 93355: 1.573-1.580 (1993)	
all	3	MAHAN. G.D. "Thermionic Refrigeration." J. Appl. Phys 76: 4362-4368 (1994)	
all	4	HUFFMAN. F.N. et al. "Preliminary Investigation of a Thermotunnel Converter." I.E.C.E.C. vol 1: 573-579 (1988)	
all	5	HOUSTON. J.M. "Theoretical Efficiency of the Thermionic Energy Converter." J. Appl. Phys. 30: 481-487 (1959)	
all	6	KING. D.B. et al. "Results from the Microminiature Thermionic Converter Demonstration Testing Program." Am. Inst. of Phys. 1-56396-846: 1432-1436 (1999)	
all	7	ZENG. T and CHEN. G. "Hot Electron Effects on Thermionic Emission Cooling in Heterostructures." Mat. Res. Soc. 545: 467-472 (1999)	
all	8	SHAKOURI. A. et al. "Enhanced Thermionic Emission Cooling in High Barrier Superlattice Heterostructures." Mat. Res. Soc. 545: 449-458 (1999)	
all	9	FUKUDA. R. et al. "Development of the Oxygenated Thermionic Energy Converters Utilizing the Sputtered Metal Oxides as a Collector." Am. Inst. Phys. 1444-1451 (1999)	
all	10	SVENSSON. R. and HOLMLID. L. "TEC as Electric Generator in an Automobile Catalytic Converter." IEEE. Vol 2: 941-944 (1996)	

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